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The MES logo features an illustration of ***Euphydryas phaëton*** (Drury) (Lepidoptera: Nymphalidae), the Baltimore Checkerspot, with its generic name above and its specific epithet below (both in capital letters), all on a pale green field; all these are within a yellow ring double-bordered by red, bearing the message "• Maryland Entomological Society • 1971 •". All of this is positioned above the Shield of the State of Maryland. In 1973, the Baltimore Checkerspot was named the official insect of the State of Maryland through the efforts of many MES members.

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The Maryland Entomologist 6(4):1

Editor's Note

This year's issue of *The Maryland Entomologist* features an in-depth article titled "Specialist Bees of the Mid-Atlantic: Host Plants and Habitat Conservation" by Jarrod Fowler. Jarrod is the Pollinator Conservation and Conservation Biological Control Specialist for New England and Northeast Regions at The Xerces Society and a Technical Service Provider at the United States Department of Agriculture - Natural Resources Conservation Service. He has performed horticulture and entomology in New England for 20 years and is proficient in science-based and sustainable insect habitat assessment, design, installation, maintenance, and monitoring. Jarrod leads extensive insect habitat restoration efforts with farmers and landowners in New England.

Eugene J. Scarpulla
Editor

The Maryland Entomologist 6(4):2-40

Specialist Bees of the Mid-Atlantic: Host Plants and Habitat Conservation

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Abstract: Habitat conservation is performed in North America to support populations of managed and wild pollinators. The current recommended plant selections for Mid-Atlantic pollinator habitats primarily provide resources for common or generalist pollinators. However, such plants may not foster uncommon or rare Mid-Atlantic specialist pollinators, whose populations are susceptible to harm from anthropogenic threats. This manuscript presents the first catalog of native specialist bees and associated host plants for the Mid-Atlantic. Approximately 29% of Mid-Atlantic native bee species are pollen specialists. I cataloged 6 families, 25 genera, and 131 species of Mid-Atlantic native bees that restrict their pollen use to 28 families, 54 genera, and 396 possible species of host plants. Specialist bees are associated with non-graminoid forbs and non-coniferous woody plants in nearly all Mid-Atlantic terrestrial and wetland habitats. Vulnerable bee-plant associations requiring greater emphasis in research and restoration are identified and discussed.

Keywords: Apoidea, Anthophila, habitat restoration, Mid-Atlantic, oligolecty, pollen specialization

INTRODUCTION

Mid-Atlantic native-pollen specialist bees (oligoleges) have evolved a continuum of facultative or obligate associations with flowering host plants (Robertson 1925, Linsley and MacSwain 1958, Hurd et al. 1980, Cane and Sipes 2006). Oligoleges associate with one host plant family or a few related genera or species; monoleges specifically associate with a single host plant genus or species (Robertson 1925, Cane and Sipes 2006). Such associations can benefit both bee and flower species by improving foraging effectiveness and efficiency, pollen digestibility, and pollination rates. However, restricted associations can be susceptible to harm due to habitat degradation, fragmentation, and loss, or to phenological mismatch (Minckley et al. 1994, Bartomeus et al. 2013, Rafferty et al. 2015). Consequently, anthropogenic threats in the Mid-Atlantic potentially imperil native specialist bee species and their endemic, indigenous host plant species with population declines and extinctions through loss of plant diversity (Radeloff et al. 2005).

Pollen associations and preferences for many Mid-Atlantic native specialist bees can be derived from many published and unpublished field observations and specimen records (Lovell 1918; Robertson 1926, 1929; Mitchell 1960, 1962). Here, I organize bee-plant observations and records to catalog Mid-Atlantic native host plants for native specialist

bees. This catalog provides opportunities to augment current lists of plant selections for pollinator habitat conservation and enhancement with recommended host plants for specialist bees. Such recommendations can be integrated into pollinator habitat practices, and are broadly relevant to the Mid-Atlantic and the adjacent regions in Canada and the Northeastern United States.

Field-site Description

This research includes pollination records from the Mid-Atlantic United States for six states: Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia. New York is often included in definitions of what comprises the Mid-Atlantic, but has been excluded from consideration. The combination of "Specialist Bees of the Northeast: Host Plants and Habitat Conservation" (Fowler 2016) and the present manuscript will encompass most bee-plant associations found in New York. The District of Columbia (DC) has been similarly excluded from consideration. Urbanized DC is geographically minute compared to surrounding Maryland and Virginia.

The Mid-Atlantic is an ecologically and topographically diverse region within the temperate broadleaf and mixed forest biome. Topography ranges from western low mountains and plateaus, with elevations up to 1,750 m (5741 ft), to outwash plains of unconsolidated sediments that create a large coastal plain which contains extensive marshes, barrier islands, and dune systems (Omernik 1987; Jones et al. 1997). Overall, humid cold temperate and warm continental climates with moderate precipitation and moist yet well-drained soils foster species-dense and species-rich communities of native, endemic, exotic, and hybrid terrestrial, wetland, and aquatic plant species (Adamson et al. 2015).

METHODS

Here specialist bees are defined as those that restrict pollen foraging from only one host plant family (Robertson 1925, Cane and Sipes 2006). In reality, most specialist bee records are associated with one host plant genus or species. Specialist bees that are indigenous to Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia without human intervention were defined as Mid-Atlantic natives. Specimen records of approximately 450 species of native bees captured or observed on flowers of host plants were compiled from online sources (Hilty 2012, Ascher and Pickering 2016), peer reviewed articles (Robertson 1926, 1929; LaBerge 1969, 1971, 1973, 1977, 1980, 1985, 1986, 1989; LaBerge and Bouseman 1970; LaBerge and Ribble 1972, 1975; Bouseman and LaBerge 1978), technical bulletins (Mitchell 1960, 1962; LaBerge 1967; Krombein et al. 1979), and personal communications with contemporary bee researchers. Information concerning conservation statuses, habitats, native ranges, nesting organizations, monthly phenologies, numbers of records per state, and taxonomies was collected in addition to host plant associations for each bee species. Cleptoparasitic bees were not included in our study.

Bee-plant records were compared with state-level Mid-Atlantic plant distributions from the United States Department of Agriculture - Natural Resources Conservation Service PLANTS Database (USDA-NRCS 2016). According to plant distribution source

definitions, native species are historically indigenous prior to European colonization and present species have been documented as uncultivated native or naturalized populations (USDA-NRCS 2016). This study includes only host plant genera and species that are native and documented as present in at least one of the six Mid-Atlantic states. If there are records of specialist bee species collected from Mid-Atlantic native plant genera or species, even if those collections came from outside the Mid-Atlantic, then such plant taxa are listed. Because plant taxonomy has recently undergone major changes, many names have been updated compared to those published in the original literature of bee-plant associations. Information concerning plant taxonomy, morphological groupings, native ranges, and habitat types (obligate–facultative–upland) was compiled for each host plant species. As above, such data were analyzed and summarized to provide recommendations for targeted conservation and management in the Mid-Atlantic and nearby regions.

RESULTS

One hundred thirty-one species, or 29% of approximately 450 Mid-Atlantic native bee species, were pollen specialists. Six families, 25 genera, and 131 species of Mid-Atlantic native bees and 28 families, 54 genera, and 396 possible species of host plants were cataloged. Specialist bees are alphabetically tabulated with associated host plant families and genera in Table 1. Conversely, host plant families and genera with hosted bee families and species are summarized in Table 2. The most recurrent host plant family association among specialist bee species was Asteraceae, 58 bee spp. The most recurrent host plant genera associations among specialist bee species were *Salix* L. (willows), 11 bee spp.; *Solidago* L. (goldenrods), 11 bee spp.; *Vaccinium* L. (blueberries), 8 bee spp.; *Helianthus* L. (sunflowers), 7 bee spp.; and *Symphyotrichum* Nees (asters), 7 bee spp.

Six families, 25 genera, and 131 species of Mid-Atlantic native specialist bees were cataloged. Life history and taxonomic information about Mid-Atlantic native specialist bees are presented in Supplemental Table 3. The bee family with the most specialists in the Mid-Atlantic was Andrenidae (mining bees), 70 spp., and the bee genus with most species was *Andrena* Fabricius, 47 spp. Of the 131 bee species, 66 were considered rare, while 49 were uncommon, and 15 were common. All bee species presented are solitary nesters and none are known to be eusocial, although some might be communal (e.g., *Perdita* Smith [Andrenidae]) or aggregate nesters (e.g., *Colletes* Latreille [Colletidae]). Additionally, most cataloged bees are soil nesters with the exception of 13 Megachilidae (leafcutter, mason, and resin bees), which likely nest in hollow/pithy stems or holes in wood. Overall numbers of specialist bee species active per family per month are presented in Figure 1. Specialist bee adults were effectively inactive during December, January, and February in the Mid-Atlantic, remaining in their natal nests as pre-pupae or as adults in some early-spring emerging species.

Associations with non-graminoid (non-grass or non-grass-like) forbs and non-coniferous woody plants were clear for all Mid-Atlantic specialist bee species. Twenty-eight families, 54 genera, and 396 possible species of native host plants were cataloged. Life history and taxonomic information about Mid-Atlantic native host plants are presented in Supplemental Table 4. Overall, the host plant families with the greatest number of species were Asteraceae (140 spp.), Ericaceae (33 spp.), Brassicaceae (26 spp.), and Violaceae (26 spp.). The host plant genera with the greatest number of species were

Table 1. Mid-Atlantic native specialist bee families and species with their associated host plant families and genera. Bee families and member genera and species with associated host plants are presented in ascending alphabetical order. Consult Supplementary Tables 3 and 4 for additional information.

Bee Family	Bee Species	Host Plant Family	Host Plant Genus
Andrenidae	*Andrena accepta*	Asteraceae	*Helianthus*
	Andrena aliciae	Asteraceae	*Helianthus*
	Andrena andrenoides	Salicaceae	*Salix*
	Andrena arabis	Brassicaceae	*Arabis*
			Cardamine
	Andrena asteris	Asteraceae	*Solidago*
			Symphyotrichum
	Andrena asteroides	Asteraceae	*Symphyotrichum*
	Andrena bisalicis	Salicaceae	*Salix*
	Andrena braccata	Asteraceae	*Euthamia*
			Solidago
	Andrena bradleyi	Ericaceae	*Gaylussacia*
			Vaccinium
	Andrena canadensis	Asteraceae	*Solidago*
	Andrena carolina	Ericaceae	*Vaccinium*
	Andrena chromotricha	Asteraceae	.
	Andrena clarkella	Salicaceae	*Salix*
	Andrena cornelli	Ericaceae	*Rhododendron*
	Andrena distans	Geraniaceae	*Geranium*
	Andrena duplicata	Asteraceae	.
	Andrena erigeniae	Portulacaceae	*Claytonia*
	Andrena erythrogaster	Salicaceae	*Salix*
	Andrena erythronii	Liliaceae	*Erythronium*
	Andrena fragilis	Cornaceae	*Cornus*
	Andrena frigida	Salicaceae	*Salix*
	Andrena fulvipennis	Asteraceae	*Chrysopsis*
			Heterotheca
			Pityopsis
	Andrena gardineri	Asteraceae	*Packera*
	Andrena geranii	Hydrophyllaceae	*Hydrophyllum*
	Andrena helianthi	Asteraceae	*Helianthus*
	Andrena hirticincta	Asteraceae	*Euthamia*
			Solidago
	Andrena illinoiensis	Salicaceae	*Salix*
	Andrena integra	Cornaceae	*Cornus*
	Andrena krigiana	Asteraceae	*Krigia*
	Andrena lamelliterga	Hydrophyllaceae	*Phacelia*
	Andrena macoupinensis	Salicaceae	*Salix*
	Andrena mariae	Salicaceae	*Salix*
	Andrena melanochroa	Rosaceae	*Fragaria*
	Andrena nida	Salicaceae	*Salix*
	Andrena nigrae	Salicaceae	*Salix*
	Andrena nubecula	Asteraceae	*Solidago*
			Symphyotrichum
	Andrena phaceliae	Hydrophyllaceae	*Phacelia*
	Andrena placata	Asteraceae	*Solidago*
			Symphyotrichum

Bee Family	Bee Species	Host Plant Family	Host Plant Genus
	Andrena platyparia	Cornaceae	*Cornus*
	Andrena polemonii	Polemoniaceae	*Polemonium*
	Andrena rudbeckiae	Asteraceae	*Rudbeckia*
	Andrena salictaria	Salicaceae	*Salix*
	Andrena simplex	Asteraceae	*Solidago*
			Symphyotrichum
	Andrena uvulariae	Liliaceae	*Uvularia*
	Andrena violae	Violaceae	*Viola*
	Andrena ziziae	Apiaceae	*Zizia*
	Andrena ziziaeformis	Rosaceae	*Potentilla, Waldsteinia*
	Calliopsis nebraskensis	Verbenaceae	*Verbena*
	Panurginus atramontensis	Ericaceae	*Vaccinium*
	Panurginus potentillae	Rosaceae	*Potentilla*
	Perdita bequaerti	Asteraceae	*Helianthus*
	Perdita bishoppi	Asteraceae	*Chrysopsis*
			Heterotheca
			Pityopsis
	Perdita boltoniae	Asteraceae	*Chrysopsis*
			Heterotheca
			Pityopsis
	Perdita consobrina	Asteraceae	.
	Perdita gerardiae	Scrophulariaceae	*Agalinis*
	Perdita gerhardi	Lamiaceae	*Monarda*
	Perdita halictoides	Solanaceae	*Physalis*
	Perdita octomaculata	Asteraceae	*Solidago*
	Perdita swenki	Asteraceae	.
	Protandrena abdominalis	Lamiaceae	*Monarda*
	Pseudopanurgus aestivalis	Asteraceae	*Solidago*
			Symphyotrichum
	Pseudopanurgus albitarsis	Asteraceae	.
	Pseudopanurgus andrenoides	Asteraceae	.
	Pseudopanurgus compositarum	Asteraceae	.
	Pseudopanurgus illinoiensis	Asteraceae	.
	Pseudopanurgus labrosiformis	Asteraceae	.
	Pseudopanurgus labrosus	Asteraceae	.
	Pseudopanurgus pauper	Rhamnaceae	*Ceanothus*
	Pseudopanurgus rugosus	Asteraceae	.
	Pseudopanurgus virginicus	Rubiaceae	*Houstonia*
Apidae	*Anthophorula micheneri*	Scrophulariaceae	*Agalinis*
	Cemolobus ipomoeae	Convolvulaceae	*Ipomoea*
	Florilegus condignus	Pontederiaceae	*Pontederia*
	Habropoda laboriosa	Ericaceae	*Cercis*
			Vaccinium
	Melissodes agilis	Asteraceae	*Helianthus*
	Melissodes apicatus	Pontederiaceae	*Pontederia*
	Melissodes boltoniae	Asteraceae	.
	Melissodes denticulatus	Asteraceae	*Vernonia*
	Melissodes dentiventris	Asteraceae	.
	Melissodes desponsus	Asteraceae	*Cirsium*
	Melissodes druriellus	Asteraceae	.
	Melissodes fimbriatus	Onagraceae	*Oenothera*
	Melissodes fumosus	Asteraceae	.
	Melissodes illatus	Asteraceae	.
	Melissodes niveus	Asteraceae	.

Bee Family	Bee Species	Host Plant Family	Host Plant Genus
	Melissodes subillatus	Asteraceae	.
	Melissodes trinodis	Asteraceae	.
	Melitoma taurea	Convolvulaceae	*Ipomoea*
	Ptilothrix bombiformis	Malvaceae	*Hibiscus*
	Svastra compta	Onagraceae	*Oenothera*
	Svastra obliqua	Asteraceae	.
	Svastra petulca	Asteraceae	.
Colletidae	*Colletes aestivalis*	Saxifragaceae	*Heuchera*
	Colletes banksi	Aquifoliaceae	*Ilex*
	Colletes brevicornis	Campanulaceae	*Campanula*
			Triodanis
	Colletes compactus	Asteraceae	.
	Colletes latitarsis	Solanaceae	*Physalis*
	Colletes productus	Ericaceae	*Lyonia*
			Vaccinium
	Colletes simulans	Asteraceae	*Euthamia*
			Solidago
			Symphyotrichum
	Colletes solidaginis	Asteraceae	*Solidago*
	Colletes speculiferus	Asteraceae	.
	Colletes thysanellae	Asteraceae	.
	Colletes validus	Ericaceae	.
	Colletes willistoni	Solanaceae	*Physalis*
Halictidae	*Dieunomia heteropoda*	Asteraceae	*Bidens*
			Helianthus
	Dieunomia nevadensis	Asteraceae	.
	Dufourea monardae	Lamiaceae	*Monarda*
	Dufourea novaeangliae	Pontederiaceae	*Pontederia*
	Lasioglossum lustrans	Asteraceae	*Pyrrhopappus*
	Lasioglossum oenotherae	Onagraceae	*Oenothera*
	Lasioglossum pectinatum	Solanaceae	*Physalis*
Megachilidae	*Hoplitis simplex*	Hydrophyllaceae	*Nemophila*
			Phacelia
	Megachile inimica	Asteraceae	.
	Megachile integra	Fabaceae	*Galactia*
			Strophostyles
	Megachile oenotherae	Onagraceae	*Oenothera*
	Megachile parallela	Asteraceae	.
	Megachile pugnata	Asteraceae	*Helianthus*
	Osmia chalybea	Asteraceae	*Cirsium*
	Osmia distincta	Scrophulariaceae	*Penstemon*
	Osmia texana	Asteraceae	*Cirsium*
	Osmia virga	Ericaceae	*Vaccinium*
	Paranthidium jugatorium	Asteraceae	*Helianthus*
	Trachusa dorsalis	Fabaceae	*Strophostyles*
Melittidae	*Macropis ciliata*	Primulaceae	*Lysimachia*
	Macropis nuda	Primulaceae	*Lysimachia*
	Macropis patellata	Primulaceae	*Lysimachia*
	Macropis steironematis	Primulaceae	*Lysimachia*
	Melitta americana	Ericaceae	*Vaccinium*
	Melitta eickworti	Ericaceae	*Vaccinium*
	Melitta melittoides	Ericaceae	*Lyonia*

Table 2. Mid-Atlantic native plant families and genera with their hosted bee families and species. Plant families and member genera with hosted bees are presented in ascending alphabetical order. Consult Supplementary Tables 3 and 4 for additional information.

Host Plant Family	Host Plant Genus	Bee Family	Bee Species
Apiaceae	*Zizia*	Andrenidae	*Andrena ziziae*
Aquifoliaceae	*Ilex*	Colletidae	*Colletes banksi*
Asteraceae	.	Andrenidae	*Andrena chromotricha*
			Andrena duplicata
			Perdita consobrina
			Perdita swenki
			Pseudopanurgus albitarsis
			Pseudopanurgus andrenoides
			Pseudopanurgus compositarum
			Pseudopanurgus illinoiensis
			Pseudopanurgus labrosiformis
			Pseudopanurgus labrosus
			Pseudopanurgus rugosus
		Apidae	*Melissodes boltoniae*
			Melissodes dentiventris
			Melissodes druriellus
			Melissodes fumosus
			Melissodes illatus
			Melissodes niveus
			Melissodes subillatus
			Melissodes trinodis
			Svastra obliqua
			Svastra petulca
		Colletidae	*Colletes compactus*
			Colletes speculiferus
			Colletes thysanellae
		Halictidae	*Dieunomia nevadensis*
		Megachilidae	*Megachile inimica*
			Megachile parallela
			Megachile xylocopoides
	Bidens	Halictidae	*Dieunomia heteropoda*
	Chrysopsis	Andrenidae	*Andrena fulvipennis*
			Perdita bishoppi
			Perdita boltoniae
	Cirsium	Apidae	*Melissodes desponsus*
		Megachilidae	*Osmia chalybea*
			Osmia texana
	Euthamia	Andrenidae	*Andrena braccata*
			Andrena hirticincta
		Colletidae	*Colletes simulans*
	Helianthus	Andrenidae	*Andrena accepta*
			Andrena aliciae
			Andrena helianthi
			Perdita bequaerti
		Apidae	*Melissodes agilis*
		Halictidae	*Dieunomia heteropoda*
		Megachilidae	*Megachile pugnata*

Host Plant Family	Host Plant Genus	Bee Family	Bee Species
			Paranthidium jugatorium
	Heterotheca	Andrenidae	*Andrena fulvipennis*
			Perdita bishoppi
			Perdita boltoniae
	Krigia	Andrenidae	*Andrena krigiana*
	Packera	Andrenidae	*Andrena gardineri*
	Pityopsis	Andrenidae	*Andrena fulvipennis*
			Perdita bishoppi
			Perdita boltoniae
	Pyrrhopappus	Halictidae	*Lasioglossum lustrans*
	Rudbeckia	Andrenidae	*Andrena rudbeckiae*
	Solidago	Andrenidae	*Andrena asteris*
			Andrena braccata
			Andrena canadensis
			Andrena hirticincta
			Andrena nubecula
			Andrena placata
			Andrena simplex
			Perdita octomaculata
			Pseudopanurgus nebrascensis
		Colletidae	*Colletes simulans*
			Colletes solidaginis
	Symphyotrichum	Andrenidae	*Andrena asteris*
			Andrena asteroides
			Andrena nubecula
			Andrena placata
			Andrena simplex
			Pseudopanurgus nebrascensis
		Colletidae	*Colletes simulans*
	Vernonia	Apidae	*Melissodes denticulatus*
Brassicaceae	*Arabis*	Andrenidae	*Andrena arabis*
	Cardamine	Andrenidae	*Andrena arabis*
Campanulaceae	*Campanula*	Colletidae	*Colletes brevicornis*
	Triodanis	Colletidae	*Colletes brevicornis*
Convolvulaceae	*Ipomoea*	Apidae	*Cemolobus ipomoeae*
			Melitoma taurea
Cornaceae	*Cornus*	Andrenidae	*Andrena fragilis*
			Andrena integra
			Andrena platyparia
Ericaceae	.	Colletidae	*Colletes validus*
	Gaylussacia	Andrenidae	*Andrena bradleyi*
	Lyonia	Colletidae	*Colletes productus*
		Melittidae	*Melitta melittoides*
	Rhododendron	Andrenidae	*Andrena cornelli*
	Vaccinium	Andrenidae	*Andrena bradleyi*
			Andrena carolina
			Panurginus atramontensis
		Apidae	*Habropoda laboriosa*
		Colletidae	*Colletes productus*
		Megachilidae	*Osmia virga*
		Melittidae	*Melitta americana*
			Melitta eickworti
Fabaceae	*Cercis*	Apidae	*Habropoda laboriosa*
	Galactia	Megachilidae	*Megachile integra*

Host Plant Family	Host Plant Genus	Bee Family	Bee Species
	Strophostyles	Megachilidae	*Megachile integra*
			Trachusa dorsalis
Geraniaceae	*Geranium*	Andrenidae	*Andrena distans*
Hydrophyllaceae	*Hydrophyllum*	Andrenidae	*Andrena geranii*
	Nemophila	Megachilidae	*Hoplitis simplex*
	Phacelia	Andrenidae	*Andrena lamelliterga*
			Andrena phaceliae
		Megachilidae	*Hoplitis simplex*
Lamiaceae	*Monarda*	Andrenidae	*Perdita gerhardi*
			Protandrena abdominalis
		Halictidae	*Dufourea monardae*
Liliaceae	*Erythronium*	Andrenidae	*Andrena erythronii*
	Uvularia	Andrenidae	*Andrena uvulariae*
Malvaceae	*Hibiscus*	Apidae	*Ptilothrix bombiformis*
Onagraceae	*Oenothera*	Apidae	*Melissodes fimbriatus*
			Svastra compta
		Halictidae	*Lasioglossum oenotherae*
		Megachilidae	*Megachile oenotherae*
Polemoniaceae	*Polemonium*	Andrenidae	*Andrena polemonii*
Pontederiaceae	*Pontederia*	Apidae	*Florilegus condignus*
			Melissodes apicata
		Halictidae	*Dufourea novaeangliae*
Portulacaceae	*Claytonia*	Andrenidae	*Andrena erigeniae*
Primulaceae	*Lysimachia*	Melittidae	*Macropis ciliata*
			Macropis nuda
			Macropis patellata
			Macropis steironematis
Rhamnaceae	*Ceanothus*	Andrenidae	*Pseudopanurgus pauper*
Rosaceae	*Fragaria*	Andrenidae	*Andrena melanochroa*
	Potentilla	Andrenidae	*Andrena ziziaeformis*
			Panurginus potentillae
	Waldsteinia	Andrenidae	*Andrena ziziaeformis*
Rubiaceae	*Houstonia*	Andrenidae	*Pseudopanurgus virginicus*
Salicaceae	*Salix*	Andrenidae	*Andrena andrenoides*
			Andrena bisalicis
			Andrena clarkella
			Andrena erythrogaster
			Andrena frigida
			Andrena illinoiensis
			Andrena macoupinensis
			Andrena mariae
			Andrena nida
			Andrena nigrae
			Andrena salictaria
Saxifragaceae	*Heuchera*	Colletidae	*Colletes aestivalis*
Scrophulariaceae	*Agalinis*	Andrenidae	*Perdita gerardiae*
		Apidae	*Anthophorula micheneri*
	Penstemon	Megachilidae	*Osmia distincta*
Solanaceae	*Physalis*	Andrenidae	*Perdita halictoides*
		Colletidae	*Colletes latitarsis*
			Colletes willistoni
		Halictidae	*Lasioglossum pectinatum*
Verbenaceae	*Verbena*	Andrenidae	*Calliopsis nebraskensis*
Violaceae	*Viola*	Andrenidae	*Andrena violae*

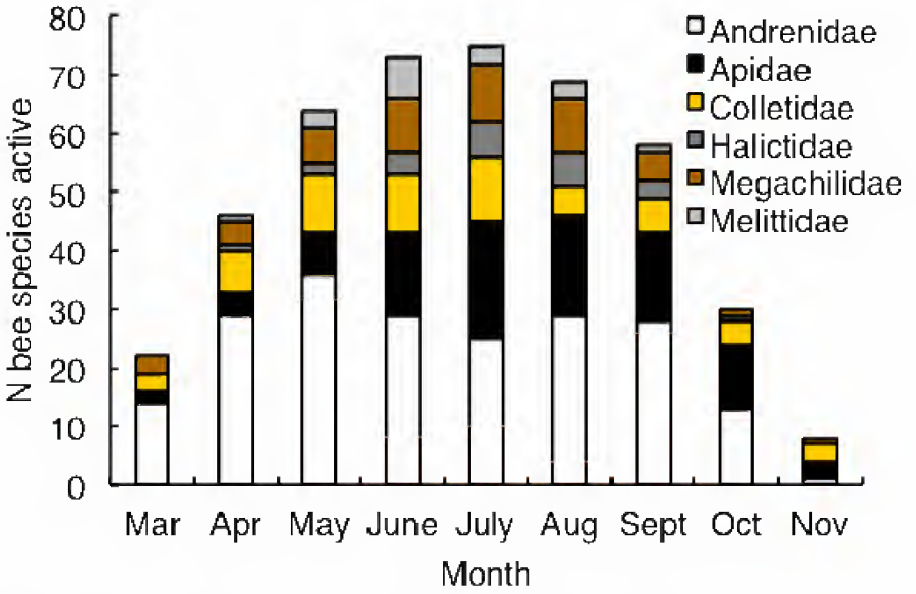

Figure 1. Numbers of Mid-Atlantic specialist bee species active per family per month. Specialist bee adults were inactive during December, January, and February in the Mid-Atlantic. Overall numbers of species per month were: July (75 spp.), June (73 spp.), August (69 spp.), May (64 spp.), September (58 spp.), April (46 spp.), October (30 spp.), March (22 spp.), and November (8 spp.).

Solidago (35 spp.); *Symphyotrichum* (32 spp.); *Viola* L., violets, (26 spp.); *Helianthus* (18 spp.), *Oenothera* L., evening primroses, (17 spp.), and *Salix* (16 spp.). Host plants were primarily "herbaceous, flowering dicots" (317 spp.) and secondarily "broad-leaf woody shrubs" (40 spp.), "broad-leaf woody shrub-trees" (29 spp.), "herbaceous, flowering monocots" (8 spp.), and "broad-leaf woody trees" (2 spp.).

Associations with terrestrial and wetland habitats were clear for all Mid-Atlantic specialist bee species. The host plant habitat types (266 spp.) were primarily "facultative-wetland" (51 spp.) and secondarily "facultative-upland" (49 spp.), "facultative" (45 spp.), "obligate" (40 spp.), and "facultative-facultative-upland" (25 spp.). Of the 396 possible species of host plants, 171 species were native in all six Mid-Atlantic states.

DISCUSSION

This manuscript presents the first catalog of specialist bees and associated host plants for the Mid-Atlantic United States. Specialist bees, associated host plants, and future work will be discussed in the following paragraphs. In the process, recommendations will be provided according to the results.

Bees

The distribution of pollen specialists among the bee families, genera, and subgenera of the Mid-Atlantic is not random. Family Melittidae (oil bees) showed clear preferences: all three listed species of *Melitta* Kirby were associated with Ericaceae, while all four catalogued species of *Macropis* Panzer were associated with *Lysimachia* L. (yellow loosestrifes). All 11 cataloged species of *Andrena* subgenus *Callandrena* sensu lato and four cataloged species of *Andrena* subgenus *Cnemidandrena* were associated with Asteraceae. Similarly, all 10 cataloged species of *Melissodes* Latreille (Apidae; long-horned bees) subgenus *Eumelissodes* were associated with Asteraceae. Moreover, all three catalogued species of *Andrena* subgenus *Gonandrena* associated with *Cornus* L. (dogwoods).

Notably, the dominant and speciose bees in the families Halictidae (sweat bees) and Megachilidae are nearly devoid of oligoleges. Social bumble bees, *Bombus* Latreille (Apidae), have no pollen specialists, and oligoleges are similarly absent in the common masked bee genus *Hylaeus* Fabricius (Colletidae). Generalist bees of polyphagous and social groups do not restrict pollen, but do have broad and clear preferences for flowers based on body size, shape, and tongue morphology.

Several bee species deserve explanation for their exclusion. The Squash Bee, *Peponapis pruinosa* (Say), and its less common close relative *Xenoglossa strenua* (Cresson) (both Apidae) are native to North America and are present in much of the Mid-Atlantic (Hurd et al. 1971). *Peponapis pruinosa* is present throughout the Mid-Atlantic while *X. strenua* is restricted to Virginia and southern Maryland (Hurd et al. 1971). Both species are oligoleges of plants in the genus *Cucurbita* L. (gourds), which only contains adventive species in the Mid-Atlantic. However, pumpkin and squash are extensively cultivated each year and both species are established and common in farms and home gardens. Both species may well have been established in the region for centuries, since squash and gourds were domesticated and widely planted by eastern Native American populations (Price 2009). *Chelostoma philadelphi* (Robertson) (Megachilidae) is the only native *Chelostoma* Latreille species found in eastern North America and has long been associated with the introduced woody shrub *Philadelphus coronarius* L., sweet mock orange. *Philadelphus* L. species are native to the Mid-Atlantic, but such plants are extremely uncommon. Mike Arduser (pers. comm.) and Sam Droege (pers. comm.) have records for *C. philadelphi* in areas where cultivated and wild *Philadelphus* plants do not occur nearby, suggesting unrestricted use of *Philadelphus*. Mellitologists are encouraged to research *C. philadelphi* pollen preferences because several *Chelostoma* species are known pollen specialists elsewhere in the world.

Maryland's bees are relatively well known within the Mid-Atlantic and approximately 21% (92 spp.) of Maryland bee species (431 spp.) are cleptoparasitic (laying eggs in the nests of other bees) (Droege, unpublished data) and cannot be pollen specialists since they gather no pollen. However, some cleptoparasitic bees are associated with specialist bees and therefore are indirectly dependent on the same plant groups as the specialist bees. For example, *Epeoloides pilosula* (Cresson) (Apidae), a nest parasite of now very uncommon *Macropis* species which specialize on *Lysimachia*, is extremely rare and of great conservation concern (Xerces Society 2015). One hundred six of the 131

documented specialist bees occur in Maryland based on extensive unpublished studies of regional bee species distributions (Droege, unpublished data). Such specialist bees comprise 31% of the pollen-carrying species (non-cleptoparasitic) in Maryland (339 spp.). A similar ratio is probably applicable to the entire Mid-Atlantic region.

Plants

Conservation and enhancement of native forbs, particularly *Solidago*, *Symphyotrichum*, *Helianthus*, *Euthamia* Nutt. ex Cass. (goldentops), *Oenothera*, and *Physalis* L. (groundcherries) should be fundamental for the maintenance and restoration of plant-pollinator interactions in fields, meadows, roadsides, and waste areas. The maintenance of diverse *Vaccinium*, *Lyonia* Nutt. (staggerbushes), and *Rhododendron* L. (rhododendrons) shrub communities in acidic soils will benefit many bee species. Woodland host plant restoration is also essential because many specialist bee species only live in rich deciduous forests and forage spring ephemerals (e.g., *Claytonia* L. [springbeauties] and *Erythronium* L. [fawnlilies]) which are absent in fields. Moreover, wetland restoration plantings should include *Hibiscus* L. (rosemallows), *Lysimachia*, *Pontederia* L. (pickerelweeds), *Salix*, and ericaceous plants to provide forage for known and possible wetland oligoleges.

Introduced plants should be avoided or counter-balanced by conservation and propagation of Mid-Atlantic native host plants. Native host plants are often absent from standard planting mixes, which do increase generalist bee abundance, but do not augment specialist bee biodiversity. Highly attractive and productive introduced selections should not be eliminated from plantings, but should perform more supporting roles.

This manuscript serves as a call to regional native plant propagators: add an abundance and richness of specialist bee host plants to nursery stock and seed banks. Although a number of specialist bee host plants are available from retail nurseries and seed distributors, many ecotypes of host plant genera or species remain uncultivated. Accordingly, opportunities are present for Mid-Atlantic plant propagators to diversify plant selections for ecological, social, and economic sustainability.

Future work

Given the disorganized and sparse data on pollen preferences of bees, the difficulty in determining whether bees collected on flowers are provisioning their nests with pollen from that flower or are simply collecting nectar, and that non-provisioning male bees are included in floral records, strict and quantifiable measurements of specialization are currently impossible. Data need to exist for combined floral visitation and pollen consumption records. However, since the purpose of this paper is not a precise quantification of specialization, but a basis for expanding recommended plant lists for pollinator conservation, patterns of specialization, even from disorganized and sparse data, are usually clear.

Some readers may be concerned that compiled records might be incomplete. Any quantitative definition of host plants for bees will be partially incomplete given the broad and imprecise range of available source information on spatiotemporal pollen gathering activities. Available sources almost never provide complete, consistent, or rigorously

quantitative data or details for each bee species. However, we feel that the combination of weighing the literature, information from museum collections, direct field experience, and vetting the catalog with field experts allows us to qualitatively identify these primary associations at the genus level. If this publication stimulates subsequent investigations and clarifications, then this manuscript will be a success.

There is an information gap in our understanding of the status and distribution of bees and associated plant populations in the Mid-Atlantic. Published bee faunas are generally sparse for North America (<50) and primarily of recent origin, particularly in contrast to the >2700 published floras (Palmer 2015). Such a discrepancy between faunas and floras indicates an overall lack of knowledge concerning the taxonomy, life history, and distribution of bees. Eight Maryland, two Pennsylvania, two New Jersey, and one Virginia bee faunas have been published (Winfree et al. 2007 [NJ]; Winfree et al. 2008 [NJ, PA]; Droege et al. 2009 [MD]; Steury et al. 2009 [VA]; Donovall and vanEngelsdorp 2010 [PA]; Orr 2010 [MD]; Droege and Shapiro 2011, 2012 [MD]; Shapiro and Droege 2011, 2012 [MD]; Droege 2013 [MD]; Scarpulla 2013 [MD]). However, only one state, Pennsylvania, has published a comprehensive bee fauna (Donovall and vanEngelsdorp 2010), which is primarily a simple checklist.

Species-level patterns of specialization should be clarified by future collections and research. Degrees and patterns of pollen use by Mid-Atlantic species are undoubtedly more complicated and nuanced than presented here. Listed specialists may forage on alternate pollens at range edges or during resource dearth (e.g., *Habropoda laboriosa* [Fabricius], Southeastern Blueberry Bee, with *Cercis canadensis* L., eastern redbud); specialists might restrict pollen foraging to limited plant species within documented genera; and specialists may be so understudied that some bees likely have failed to be listed and some, perhaps, should be delisted. Consequently, there is still much to be learned about both the distribution of specialist bees in the Mid-Atlantic as well as their pollen gathering preferences.

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Table 3 (Supplementary). Mid-Atlantic native specialist bee families (n = 6), genera (n = 25), and species (n = 131). Scientific names (*Genus* [*Subgenus*] *species*, Taxonomic authority), native ranges according to records from the six Mid-Atlantic states (DE, MD, NJ, PA, VA, and WV), seasons of peak activity (Spring, Summer, or Fall), local conservation status (Common = C, Uncommon = U, or Rare = R), and host plant genera or host plant families are provided. Bee families and member genera and species are presented in ascending alphabetical order. Peak activity was provided by Droege (in litt.) and associated with host plant flowering phenology. Status was also provided by Droege (in litt.). All other data were compiled initially from Discover Life (Ascher and Pickering 2016), checked against published sources (e.g., Krombein et al. 1979, and references therein) if available, refined through discussions with regional bee experts, and supplemented and revised with unpublished information provided by John S. Ascher (in litt.).

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
Andrenidae	*Andrena* (*Callandrena*) *accepta* Viereck, 1916	MD-NJ-VA	Fall	R	*Helianthus*
	Andrena (*Callandrena* s.l.) *aliciae* Robertson, 1891	DE-MD-NJ-PA-VA-WV	Summer	R	*Helianthus*
	Andrena (*Parandrena*) *andrenoides* (Cresson, 1878)	MD-NJ-VA	Spring	R	*Salix*
	Andrena (*Scaphandrena*) *arabis* Robertson, 1897	DE-MD-NJ-PA-VA-WV	Spring	U	*Arabis, Cardamine*
	Andrena (*Callandrena* s.l.) *asteris* Robertson, 1891	DE-MD-NJ-PA-VA-WV	Fall	C	*Solidago, Symphyotrichum*
	Andrena (*Callandrena* s.l.) *asteroides* Mitchell, 1960	MD-NJ-PA-VA	Fall	R	*Symphyotrichum*
	Andrena (*Thysandrena*) *bisalicis* Viereck, 1908	DE-MD-NJ-PA-VA-WV	Spring	U	*Salix*
	Andrena (*Callandrena* s.l.) *braccata* Viereck, 1907	MD-NJ-PA-VA	Fall	R	*Euthamia, Solidago*
	Andrena (*Conandrena*) *bradleyi* Viereck, 1907	DE-MD-NJ-PA-VA	Spring	U	*Gaylussacia, Vaccinium*
	Andrena (*Cnemidandrena*) *canadensis* Dalla Torre, 1896	NJ-VA	Fall	U	*Solidago*
	Andrena (*Andrena*) *carolina* Viereck, 1909	DE-MD-NJ-PA-VA-WV	Spring	C	*Vaccinium*
	Andrena (*Cnemidandrena*) *chromotricha* Cockerell, 1899	PA-WV	Fall	R	Asteraceae
	Andrena (*Andrena*) *clarkella* (Kirby, 1802)	WV	Spring	R	*Salix*
	Andrena (*Andrena*) *cornelli* Viereck, 1907	MD-NJ-PA-VA	Spring	U	*Rhododendron*
	Andrena (*Ptilandrena*) *distans* Provancher, 1888	MD-NJ-PA-VA	Spring	U	*Geranium*

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
	Andrena (*Callandrena*) *duplicata* Mitchell, 1960	NJ	Fall	R	Asteraceae
	Andrena (*Ptilandrena*) *erigeniae* Robertson, 1891	DE-MD-NJ-PA-VA-WV	Spring	C	*Claytonia*
	Andrena (*Tylandrena*) *erythrogaster* (Ashmead, 1890)	MD-NJ-PA-VA-WV	Spring	U	*Salix*
	Andrena (*Leucandrena*) *erythronii* Robertson, 1891	MD-NJ-PA-VA-WV	Spring	U	*Erythronium*
	Andrena (*Gonandrena*) *fragilis* Smith, 1853	DE-MD-NJ-PA-VA-WV	Summer	C	*Cornus*
	Andrena (*Andrena*) *frigida* Smith 1853	MD-NJ-PA-VA	Spring	U	*Salix*
	Andrena (*Callandrena* s.l.) *fulvipennis* Smith, 1853	DE-MD-NJ	Fall	R	*Chrysopsis, Heterotheca, Pityopsis*
	Andrena (*Callandrena* s.l.) *gardineri* Cockerell, 1906	MD-VA-WV	Spring	U	*Packera*
	Andrena (*Euandrena*) *geranii,* Robertson, 1891	MD-NJ-PA-VA-WV	Spring	U	*Hydrophyllum*
	Andrena (*Callandrena* s.l.) *helianthi* Robertson, 1891	NJ-PA-VA	Summer	R	*Helianthus*
	Andrena (*Cnemidandrena*) *hirticincta* Provancher, 1888	MD-NJ-PA-VA-WV	Fall	C	*Euthamia*, *Solidago*
	Andrena (*Micrandrena*) *illinoiensis* Robertson, 1891	MD-VA	Spring	R	*Salix*
	Andrena (*Gonandrena*) *integra* Smith, 1853	MD-NJ-PA-VA	Summer	U	*Cornus*
	Andrena (*Callandrena* s.l.) *krigiana* Robertson, 1901	MD-NJ-PA-VA-WV	Spring	U	*Krigia*
	Andrena (*Micrandrena*) *lamelliterga* Ribble, 1968	MD-PA-VA	Spring	R	*Phacelia*
	Andrena (*Andrena*) *macoupinensis* Robertson, 1900	MD-PA-VA	Spring	U	*Salix*
	Andrena (*Trachandrena*) *mariae* Robertson, 1891	MD-NJ-VA-WV	Spring	U	*Salix*
	Andrena (*Micrandrena*) *melanochroa* Cockerell, 1898	MD-NJ-VA-WV	Spring	U	Rosaceae, e.g., *Fragaria*
	Andrena (*Parandrena*) *nida* Mitchell, 1960	MD-NJ-VA-WV	Spring	U	*Salix*
	Andrena (*Micrandrena*) *nigrae* Robertson, 1905	DE-MD-NJ-PA-VA-WV	Spring	U	*Salix*
	Andrena (*Cnemidandrena*) *nubecula* Smith, 1853	DE-MD-NJ-PA-VA-WV	Fall	U	*Solidago*, *Symphyotrichum*
	Andrena (*Euandrena*) *phaceliae* Mitchell, 1960	MD-VA-WV	Spring	R	*Phacelia*
	Andrena (*Callandrena* s.l.) *placata* Mitchell, 1960	MD-NJ-PA-VA-WV	Fall	C	*Solidago*, *Symphyotrichum*
	Andrena (*Gonandrena*) *platyparia* Robertson, 1895	MD-NJ-PA-VA	Summer	U	*Cornus*

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
	Andrena (*Euandrena*) *polemonii* Robertson, 1891	WV	Spring	R	*Polemonium*
	Andrena (*Callandrena* s.l.) *rudbeckiae* Robertson, 1891	DE-MD-NJ-PA	Summer	R	*Rudbeckia*
	Andrena (*Micrandrena*) *salictaria* Robertson, 1905	MD-NJ-PA-VA-WV	Spring	R	*Salix*
	Andrena (*Callandrena* s.l.) *simplex* Smith, 1853	DE-MD-NJ-PA-VA-WV	Fall	C	*Solidago*, *Symphyotrichum*
	Andrena (*Derandrena*) *uvulariae* Mitchell, 1960	MD-NJ-PA-VA-WV	Spring	R	*Uvularia*
	Andrena (*Iomelissa*) *violae* Robertson, 1891	DE-MD-NJ-PA-VA-WV	Spring	C	*Viola*
	Andrena (*Micrandrena*) *ziziae* Robertson, 1891	MD-NJ-PA-VA-WV	Spring	U	*Zizia*
	Andrena (*Derandrena*) *ziziaeformis* Cockerell, 1908	DE-MD-NJ-PA-VA-WV	Spring	U	*Potentilla*, *Waldsteinia*
	Calliopsis (*Verbenapis*) *nebraskensis* Crawford, 1902	NJ	Summer	R	*Verbena*
	Panurginus atramontensis Crawford, 1926	MD-NJ-VA	Spring	R	*Vaccinium*
	Panurginus potentillae (Crawford, 1916)	MD-NJ-VA	Spring	U	*Potentilla*
	Perdita (*Cockerellia*) *bequaerti* Viereck, 1917	MD-NJ	Summer	R	Asteraceae
	Perdita (*Hexaperdita*) *bishoppi* Cockerell, 1906	DE-MD-NJ	Fall	R	*Chrysopsis*, *Heterotheca*, *Pityopsis*
	Perdita (*Hexaperdita*) *boltoniae* (Robertson, 1902)	DE-MD-NJ-VA	Fall	R	*Chrysopsis*, *Heterotheca*, *Pityopsis*
	Perdita (*Perdita*) *consobrina* Timberlake, 1928	VA	Fall	R	Asteraceae
	Perdita (*Perdita*) *gerardiae* Crawford, 1932	MD-NJ	Fall	R	*Agalinis*
	Perdita (*Perdita*) *gerhardi* Viereck, 1904	MD-NJ-VA-WV	Summer	R	*Monarda*
	Perdita (*Perdita*) *halictoides* Smith, 1853	MD-NJ	Summer	R	*Physalis*
	Perdita (*Perdita*) *octomaculata* (Say, 1824)	DE-MD-NJ-VA-WV	Fall	U	*Solidago*
	Perdita (*Perdita*) *swenki* Crawford, 1915	NJ	Summer	R	Asteraceae
	Protandrena abdominalis (Cresson, 1878)	MD-NJ-PA-VA-WV	Summer	R	*Monarda*
	Pseudopanurgus aestivalis (Provancher, 1882)	MD	Fall	R	*Solidago*, *Symphyotrichum*
	Pseudopanurgus albitarsis (Cresson, 1872)	VA	Summer	R	Asteraceae
	Pseudopanurgus andrenoides (Smith, 1853)	NJ-VA-WV	Fall	U	Asteraceae

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
	Pseudopanurgus compositarum (Robertson, 1893)	DE-MD-NJ-PA-VA-WV	Fall	U	Asteraceae
	Pseudopanurgus illinoiensis (Cresson, 1878)	MD-VA	Spring	R	Asteraceae
	Pseudopanurgus labrosiformis (Robertson, 1898)	MD-WV	Summer	R	Asteraceae
	Pseudopanurgus labrosus (Robertson, 1895)	VA-WV	Summer	U	Asteraceae
	Pseudopanurgus pauper (Cresson, 1878)	MD-NJ-PA-VA-WV	Summer	R	*Ceanothus*
	Pseudopanurgus rugosus (Robertson, 1895)	MD-VA	Summer	U	Asteraceae
	Pseudopanurgus virginicus (Cockerell, 1907)	MD-VA-WV	Spring	R	*Houstonia*
Apidae	*Anthophorula* (*Anthophorisca*) *micheneri* Timberlake, 1948	VA	Fall	R	*Agalinis*
	Cemolobus ipomoeae (Robertson, 1891)	MD-PA-VA-WV	Summer	R	*Ipomoea*
	Florilegus (*Florilegus*) *condignus* (Cresson, 1878)	MD-NJ-VA	Summer	R	*Pontederia*
	Habropoda laboriosa (Fabricius, 1804)	DE-MD-NJ-PA-VA	Spring	C	*Cercis*, *Vaccinium*
	Melissodes (*Eumelissodes*) *agilis* Cresson, 1878	DE-MD-NJ-PA-VA-WV	Summer	C	Asteraceae, e.g., *Helianthus*
	Melissodes (*Apomelissodes*) *apicatus* Lovell & Cockerell, 1906	DE-MD-NJ	Summer	U	*Pontederia*
	Melissodes (*Eumelissodes*) *boltoniae* Robertson, 1905	DE-MD-PA-VA	Fall	U	Asteraceae
	Melissodes (*Eumelissodes*) *denticulatus* Smith, 1854	DE-MD-NJ-PA-VA-WV	Fall	U	Asteraceae, e.g., *Vernonia*
	Melissodes (*Eumelissodes*) *dentiventris* Smith, 1854	DE-MD-NJ-PA-VA	Fall	U	Asteraceae
	Melissodes (*Heliomelissodes*) *desponsus* Smith, 1854	DE-MD-NJ-PA-VA-WV	Fall	C	Asteraceae, e.g., *Cirsium*
	Melissodes (*Eumelissodes*) *druriellus* (Kirby, 1802)	MD-NJ-PA-VA-WV	Fall	U	Asteraceae
	Melissodes (*Apomelissodes*) *fimbriatus* Cresson, 1878	VA	Summer	R	*Oenothera*
	Melissodes (*Eumelissodes*) *fumosus* LaBerge, 1961	MD-VA	Fall	R	Asteraceae
	Melissodes (*Eumelissodes*) *illatus* Lovell & Cockerell, 1906	WV	Fall	U	Asteraceae
	Melissodes (*Eumelissodes*) *niveus* Robertson, 1895	MD-NJ-VA	Fall	U	Asteraceae
	Melissodes (*Eumelissodes*) *subillatus* LaBerge, 1961	DE-MD-NJ-PA-VA-WV	Fall	U	Asteraceae
	Melissodes (*Eumelissodes*) *trinodis* Robertson, 1901	DE-MD-NJ-VA	Fall	U	Asteraceae

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
	Melitoma taurea (Say, 1837)	DE-MD-NJ-PA-VA-WV	Summer	C	*Ipomoea*
	Ptilothrix bombiformis (Cresson, 1878)	DE-MD-NJ-PA-VA-WV	Summer	C	*Hibiscus*
	Svastra (*Anthedonia*) *compta* (Cresson, 1878)	MD-NJ-PA	Summer	U	*Oenothera*
	Svastra (*Epimelissodes*) *obliqua* (Say, 1837)	DE-MD-NJ-VA	Summer	U	Asteraceae
	Svastra (*Epimelissodes*) *petulca* (Cresson, 1878)	NJ	Summer	R	Asteraceae
Colletidae	*Colletes aestivalis* Patton, 1879	DE-MD-VA	Summer	R	*Heuchera*
	Colletes banksi Swenk, 1908	NJ-VA	Summer	R	*Ilex*
	Colletes brevicornis Robertson, 1897	MD-NJ-VA-WV	Spring	U	*Campanula*, *Triodanis*
	Colletes compactus Cresson, 1868	DE-MD-NJ-PA-VA-WV	Fall	C	Asteraceae
	Colletes latitarsis Robertson, 1891	MD-NJ-PA-VA-WV	Summer	U	*Physalis*
	Colletes productus Robertson, 1891	MD-NJ-VA-WV	Summer	R	*Lyonia*, *Vaccinium*
	Colletes simulans Cresson, 1868	MD-NJ-PA-VA-WV	Fall	C	*Euthamia*, *Solidago*, *Symphyotrichum*
	Colletes solidaginis Swenk, 1906	MD-NJ-VA	Fall	R	*Solidago*
	Colletes speculiferus Cockerell, 1927	DE-MD-NJ-VA	Fall	U	Asteraceae
	Colletes thysanellae Mitchell, 1951	VA	Fall	R	Asteraceae
	Colletes validus Cresson, 1868	DE-MD-NJ-PA-VA	Spring	U	Ericaceae
	Colletes willistoni Robertson, 1891	MD-NJ-PA-VA	Summer	R	*Physalis*
Halictidae	*Dieunomia* (*Dieunomia*) *heteropoda* (Say, 1824)	MD-NJ-VA	Fall	R	*Bidens*, *Helianthus*
	Dieunomia (*Epinomia*) *nevadensis* (Cresson, 1874)	MD	Summer	R	Asteraceae
	Dufourea monardae (Viereck, 1924)	NJ	Summer	R	*Monarda*
	Dufourea novaeangliae (Robertson, 1897)	MD-NJ-PA-VA	Summer	R	*Pontederia*
	Lasioglossum (*Hemihalictus*) *lustrans* (Cockerell, 1897)	DE-MD-VA	Summer	R	*Pyrrhopappus*
	Lasioglossum (*Sphecodogastra*) *oenotherae* (Stevens, 1920)	MD-NJ-PA-VA-WV	Summer	U	*Oenothera*
	Lasioglossum (*Hemihalictus*) *pectinatum* (Robertson, 1890)	DE-MD-NJ-PA-VA-WV	Summer	R	*Physalis*

Family	Scientific Name	Native Range	Peak Activity	Status	Host Plant Genus or Family
Megachilidae	*Hoplitis* (*Robertsonella*) *simplex* (Cresson, 1864)	DE-MD-NJ-VA-WV	Spring	R	*Nemophila*, *Phacelia*
	Megachile (*Sayapis*) *inimica* Cresson, 1872	DE-MD-NJ-PA-VA-WV	Summer	U	Asteraceae
	Megachile (*Megachiloides*) *integra* Cresson, 1878	MD-NJ	Summer	R	*Galactia*, *Strophostyles*
	Megachile (*Megachiloides*) *oenotherae* (Mitchell, 1924)	NJ	Spring	R	*Oenothera*
	Megachile (*Argyropile*) *parallela* Smith, 1853	VA	Summer	R	Asteraceae
	Megachile (*Sayapis*) *pugnata* Say, 1837	DE-MD-NJ-PA-VA-WV	Summer	U	Asteraceae, e.g., *Helianthus*
	Megachile (*Melanosarus*) *xylocopoides* Smith, 1853	DE-MD-NJ-VA	Summer	U	Asteraceae
	Osmia (*Helicosmia*) *chalybea* Smith, 1853	DE-MD-NJ-VA-WV	Summer	R	*Cirsium*
	Osmia (*Melanosmia*) *distincta* Cresson, 1864	MD-NJ-PA-VA-WV	Spring	U	*Penstemon*
	Osmia (*Helicosmia*) *texana* Cresson, 1872	MD-VA-WV	Summer	R	*Cirsium*
	Osmia (*Melanosmia*) *virga* Sandhouse, 1939	DE-MD-NJ-PA-VA-WV	Spring	U	*Vaccinium*
	Paranthidium (*Paranthidium*) *jugatorium* (Say, 1824)	MD-NJ-VA-WV	Summer	R	*Helianthus*
	Trachusa (*Heteranthidium*) *dorsalis* (Lepeletier, 1841)	NJ	Summer	R	*Strophostyles*
Melittidae	*Macropis* (*Macropis*) *ciliata* Patton, 1880	MD-NJ-PA-VA	Summer	R	*Lysimachia*
	Macropis (*Macropis*) *nuda* (Provancher, 1882)	NJ-PA-WV	Summer	R	*Lysimachia*
	Macropis (*Macropis*) *patellata* Patton, 1880	MD-NJ-PA-VA	Summer	R	*Lysimachia*
	Macropis (*Macropis*) *steironematis* Robertson, 1891	VA	Summer	R	*Lysimachia*
	Melitta (*Cilissa*) *americana* (Smith, 1853)	NJ	Summer	R	*Vaccinium*
	Melitta (*Cilissa*) *eickworti* Snelling & Stage, 1995	MD-NJ-WV	Spring	R	*Vaccinium*
	Melitta (*Cilissa*) *melittoides* (Viereck, 1909)	MD-NJ-PA-VA	Summer	R	*Lyonia*

Table 4 (Supplementary). Mid-Atlantic native specialist bee primary host plant families (n = 28), genera (n = 54), and species (n = 396). Taxonomic authorities, common names, plant groups (D = Herbaceous, flowering dicot, M = Herbaceous, flowering monocot, S = Broad-leaf woody shrub, ST = Broad-leaf woody shrub-tree, and T = Broad-leaf woody tree), habitats (O = Obligate wetland, FW = Facultative wetland, F = Facultative, FU = Facultative Upland, U = Upland, and '.' = No data), and native ranges according to six states (DE, MD, NJ, PA, VA, and WV) are provided. Plant families and member genera and species are presented in ascending alphabetical order. All information was compiled from the United States Department of Agriculture - Natural Resources Conservation Service PLANTS Database (2016). Table 4 is presented as a baseline for future research, but should be considered incomplete due to the generally adventitious nature of collections and observations of bees on plants. Bee species attraction to individual plant species within any genus likely varies based on resource availability, quality, and quantity.

Family	Scientific Name	Common Name	Group	Habitat	Range
Apiaceae	*Zizia aptera* (A. Gray) Fernald	Meadow zizia	D	F	DE-MD-NJ-PA-VA-WV
	Zizia aurea (L.) W.D.J. Koch	Golden zizia	D	F	DE-MD-NJ-PA-VA-WV
	Zizia trifoliata (Michx.) Fernald	Meadow alexanders	D	F-FU	MD-VA-WV
Aquifoliaceae	*Ilex ambigua* (Michx.) Torr.	Carolina holly	ST	.	VA
	Ilex collina Alexander	Longstalk holly	ST	FW	VA-WV
	Ilex coriacea (Pursh) Chapm.	Large gallberry	ST	FW	VA
	Ilex decidua Walter	Possumhaw	ST	FW	MD-VA
	Ilex glabra (L.) A. Gray	Inkberry	S	FW-F	DE-MD-NJ-PA-VA
	Ilex laevigata (Pursh) A. Gray	Smooth winterberry	ST	O-FW	DE-MD-NJ-PA-VA
	Ilex longipes Chapm. ex Trel.	Georgia holly	ST	F	VA
	Ilex montana Torr. & A. Gray ex A. Gray	Mountain holly	ST	F-FU	MD-NJ-PA-VA-WV
	Ilex mucronata (L.) Powell, Savolainen & Andrews	Catberry	ST	O	MD-NJ-PA-WV
	Ilex opaca Aiton	American holly	ST	F-FU	DE-MD-NJ-PA-VA-WV
	Ilex verticillata (L.) A. Gray	Common winterberry	ST	FW	DE-MD-NJ-PA-VA-WV
	Ilex vomitoria Aiton	Yaupon	ST	F	VA

Family	Scientific Name	Common Name	Group	Habitat	Range
Asteraceae	*Bidens alba* (L.) DC.	Romerillo	D	.	PA
	Bidens aristosa (Michx.) Britton	Bearded beggarticks	D	FW	DE-MD-NJ-PA-VA-WV
	Bidens beckii Torr. ex Spreng.	Beck's water-marigold	D	O	MD-NJ-PA
	Bidens bidentoides (Nutt.) Britton	Delmarva beggarticks	D	FW	DE-MD-NJ-PA
	Bidens bipinnata L.	Spanish needles	D	F-FU	DE-MD-NJ-PA-VA-WV
	Bidens cernua L.	Nodding beggartick	D	O	DE-MD-NJ-PA-VA-WV
	Bidens connata Muhl. ex Willd.	Purplestem beggarticks	D	.	DE-MD-NJ-PA-VA-WV
	Bidens coronata (L.) Britton	Crowned beggarticks	D	O	DE-MD-NJ-PA-VA-WV
	Bidens discoidea (Torr. & A. Gray) Britton	Small beggarticks	D	FW	DE-MD-NJ-PA-VA-WV
	Bidens eatonii Fernald	Eaton's beggarticks	D	FW	NJ
	Bidens frondosa L.	Devil's beggartick	D	FW	DE-MD-NJ-PA-VA-WV
	Bidens laevis (L.) Britton, Sterns & Poggenb.	Smooth beggartick	D	O	DE-MD-NJ-PA-VA-WV
	Bidens mitis (Michx.) Sherff	Smallfruit beggarticks	D	O	DE-MD-NJ-VA
	Bidens tripartita L.	Threelobe beggarticks	D	FW	DE-MD-NJ-PA-VA-WV
	Bidens vulgata Greene	Big devils beggartick	D	O-F	DE-MD-NJ-PA-VA-WV
	Chrysopsis gossypina (Michx.) Elliott	Cottony goldenaster	D	FU-U	VA
	Chrysopsis mariana (L.) Elliott	Maryland goldenaster	D	U	DE-MD-NJ-PA-VA-WV
	Chrysopsis pilosa Nutt.	Soft goldenaster	D	.	VA
	Cirsium altissimum (L.) Hill	Tall thistle	D	.	DE-MD-NJ-PA-VA-WV
	Cirsium carolinianum (Walter) Fernald & B.G. Schub.	Soft thistle	D	.	VA
	Cirsium discolor (Muhl. ex Willd.) Spreng.	Field thistle	D	U	DE-MD-NJ-PA-VA-WV
	Cirsium horridulum Michx.	Yellow thistle	D	F-FU	DE-MD-NJ-PA-VA
	Cirsium muticum Michx.	Swamp thistle	D	O	DE-MD-NJ-PA-VA-WV
	Cirsium nuttallii DC.	Nuttall's thistle	D	F	VA
	Cirsium pumilum Spreng.	Pasture thistle	D	.	DE-MD-NJ-PA-VA-WV
	Cirsium undulatum (Nutt.) Spreng.	Wavyleaf thistle	D	F-FU	PA

Family	Scientific Name	Common Name	Group	Habitat	Range
	Cirsium virginianum (L.) Michx.	Virginia thistle	D	FW	DE-NJ-VA
	Euthamia caroliniana (L.) Greene ex Porter & Britton	Slender goldentop	D	F	DE-MD-NJ-PA-VA
	Euthamia graminifolia (L.) Nutt.	Flat-top goldentop	D	F	DE-MD-NJ-PA-VA-WV
	Euthamia gymnospermoides Greene	Texas goldentop	D	F	WV
	Helianthus angustifolius L.	Swamp sunflower	D	FW	DE-MD-NJ-PA-VA-WV
	Helianthus annuus L.	Common sunflower	D	F	DE-MD-NJ-PA-VA-WV
	Helianthus atrorubens L.	Purpledisk sunflower	D	.	NJ-VA
	Helianthus debilis Nutt.	Cucumberleaf sunflower	D	F-U	MD-PA-VA-WV
	Helianthus decapetalus L.	Thinleaf sunflower	D	FU-U	DE-MD-NJ-PA-VA-WV
	Helianthus divaricatus L.	Woodland sunflower	D	.	DE-MD-NJ-PA-VA-WV
	Helianthus giganteus L.	Giant sunflower	D	FW	DE-MD-NJ-PA-VA-WV
	Helianthus grosseserratus M. Martens	Sawtooth sunflower	D	FW-F	DE-MD-NJ-PA-VA-WV
	Helianthus hirsutus Raf.	Hairy sunflower	D	.	MD-PA-VA-WV
	Helianthus laevigatus Torr. & A. Gray	Smooth sunflower	D	.	MD-PA-VA-WV
	Helianthus maximiliani Schrad.	Maximilian sunflower	D	U	MD-NJ-PA-VA-WV
	Helianthus microcephalus Torr. & A. Gray	Small woodland sunflower	D	U	MD-NJ-PA-VA-WV
	Helianthus mollis Lam.	Ashy sunflower	D	.	MD-NJ-PA-VA-WV
	Helianthus occidentalis Riddell	Fewleaf sunflower	D	FU-U	MD-NJ-PA-VA-WV
	Helianthus pauciflorus Nutt.	Stiff sunflower	D	.	MD-NJ-PA-VA
	Helianthus petiolaris Nutt.	Prairie sunflower	D	.	NJ-PA-VA-WV
	Helianthus strumosus L.	Paleleaf woodland sunflower	D	FU-U	DE-MD-NJ-PA-VA-WV
	Helianthus tuberosus L.	Jerusalem artichoke	D	FU	DE-MD-NJ-PA-VA-WV
	Heterotheca camporum (Greene) Shinners	Lemonyellow false goldenaster	D	.	NJ-VA
	Heterotheca subaxillaris (Lam.) Britton & Rusby	Camphorweed	D	.	DE-MD-NJ-PA-VA
	Krigia biflora (Walter) S.F. Blake	Twoflower dwarfdandelion	D	FU	DE-MD-NJ-PA-VA-WV
	Krigia caespitosa (Raf.) K.L. Chambers	Weedy dwarfdandelion	D	F	VA-WV

Family	Scientific Name	Common Name	Group	Habitat	Range
	Krigia dandelion (L.) Nutt.	Potato dwarfdandelion	D	F-FU	MD-NJ-VA
	Krigia virginica (L.) Willd.	Virginia dwarfdandelion	D	FU-U	DE-MD-NJ-PA-VA-WV
	Packera anonyma (Alph. Wood) W.A. Weber & Á. Löve	Small's ragwort	D	FU-U	DE-MD-NJ-PA-VA-WV
	Packera aurea (L.) Á. Löve & D. Löve	Golden ragwort	D	FW	DE-MD-NJ-PA-VA-WV
	Packera millefolium (Torr. & A. Gray) W.A. Weber & Á. Löve	Piedmont ragwort	D	.	VA
	Packera obovata (Muhl. ex Willd.) W.A. Weber & Á. Löve	Roundleaf ragwort	D	FU	MD-NJ-PA-VA-WV
	Packera paupercula (Michx.) Á. Löve & D. Löve	Balsam groundsel	D	FW-F	DE-MD-NJ-PA-VA-WV
	Packera plattensis (Nutt.) W.A. Weber & Á. Löve	Prairie groundsel	D	FU	PA-VA-WV
	Packera tomentosa (Michx.) C. Jeffrey	Woolly ragwort	D	FU	DE-MD-NJ-VA
	Pityopsis aspera (Shuttlw. ex Small) Small	Pineland silkgrass	D	.	VA
	Pityopsis falcata (Pursh) Nutt.	Sickleleaf silkgrass	D	.	NJ
	Pityopsis graminifolia (Michx.) Nutt.	Narrowleaf silkgrass	D	U	DE-MD-VA-WV
	Pyrrhopappus carolinianus (Walter) DC.	Carolina desert-chicory	D	.	DE-MD-PA-VA-WV
	Rudbeckia fulgida Aiton	Orange coneflower	D	F	DE-MD-NJ-PA-VA-WV
	Rudbeckia heliopsidis Torr. & A. Gray	Sunfacing coneflower	D	.	VA
	Rudbeckia hirta L.	Blackeyed Susan	D	FU	DE-MD-NJ-PA-VA-WV
	Rudbeckia laciniata L.	Cutleaf coneflower	D	FW	DE-MD-NJ-PA-VA-WV
	Rudbeckia triloba L.	Browneyed Susan	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago altissima L.	Canada goldenrod	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago arguta Aiton	Atlantic goldenrod	D	U	DE-MD-NJ-PA-VA-WV
	Solidago bicolor L.	White goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago caesia L.	Wreath goldenrod	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago canadensis L.	Canada goldenrod	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago curtisii Torr. & A. Gray	Mountain decumbent goldenrod	D	FU	MD-PA-VA-WV
	Solidago erecta Pursh	Showy goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago faucibus Wieboldt	Gorge goldenrod	D	.	VA-WV

Family	Scientific Name	Common Name	Group	Habitat	Range
	Solidago fistulosa Mill.	Pine barren goldenrod	D	FW-F	DE-MD-NJ-VA
	Solidago flaccidifolia Small	Mountain goldenrod	D	.	VA-WV
	Solidago flexicaulis L.	Zigzag goldenrod	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago gigantea Aiton	Giant goldenrod	D	FW	DE-MD-NJ-PA-VA-WV
	Solidago gracillima Torr. & A. Gray	Virginia goldenrod	D	O	VA-WV
	Solidago hispida Muhl. ex Willd.	Hairy goldenrod	D	.	MD-NJ-PA-VA-WV
	Solidago juncea Aiton	Early goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago lancifolia Torr. & A. Gray	Lance-leaf goldenrod	D	.	VA
	Solidago latissimifolia Mill.	Elliott's goldenrod	D	O	DE-MD-NJ-VA
	Solidago nemoralis Aiton	Gray goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago odora Aiton	Anisescented goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago patula Muhl. ex Willd.	Roundleaf goldenrod	D	O	DE-MD-NJ-PA-VA-WV
	Solidago pinetorum Small	Small's goldenrod	D	.	VA
	Solidago puberula Nutt.	Downy goldenrod	D	FU	DE-MD-NJ-PA-VA-WV
	Solidago radula Nutt.	Western rough goldenrod	D	.	VA
	Solidago roanensis Porter	Roan mountain goldenrod	D	.	MD-NJ-PA-VA-WV
	Solidago rugosa Mill.	Wrinkleleaf goldenrod	D	F	DE-MD-NJ-PA-VA-WV
	Solidago rupestris Raf.	Rock goldenrod	D	.	MD-PA-VA
	Solidago sempervirens L.	Seaside goldenrod	D	FW	DE-MD-NJ-PA-VA
	Solidago simplex Kunth	Mt. Albert goldenrod	D	FU	MD-PA-VA-WV
	Solidago speciosa Nutt.	Showy goldenrod	D	.	MD-NJ-PA-VA-WV
	Solidago sphacelata Raf.	Autumn goldenrod	D	.	VA-WV
	Solidago squarrosa Nutt.	Stout goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Solidago stricta Aiton	Wand goldenrod	D	O-FW	DE-MD-NJ-VA
	Solidago tortifolia Elliott	Twistleaf goldenrod	D	.	VA
	Solidago uliginosa Nutt.	Bog goldenrod	D	O	DE-MD-NJ-PA-VA-WV

Family	Scientific Name	Common Name	Group	Habitat	Range
	Solidago ulmifolia Muhl. ex Willd.	Elmleaf goldenrod	D	.	DE-MD-NJ-PA-VA-WV
	Symphyotrichum boreale (Torr. & Gray) Á. Löve & D. Löve	Northern bog aster	D	O	NJ-PA-WV
	Symphyotrichum ciliatum (Ledeb.) G.L. Nesom	Rayless alkali aster	D	F	PA
	Symphyotrichum concolor (L.) G.L. Nesom	Eastern silver aster	D	.	DE-MD-NJ-VA
	Symphyotrichum cordifolium (L.) G.L. Nesom	Common blue wood aster	D	.	DE-MD-NJ-PA-VA-WV
	Symphyotrichum depauperatum (Fernald) G.L. Nesom	Serpentine aster	D	.	MD-PA-WV
	Symphyotrichum divaricatum (Nutt.) G.L. Nesom	Southern annual saltmarsh aster	D	O	VA
	Symphyotrichum drummondii (Lindl.) G.L. Nesom	Drummond's aster	D	.	MD-PA-WV
	Symphyotrichum dumosum (L.) G.L. Nesom	Rice button aster	D	F	DE-MD-NJ-PA-VA-WV
	Symphyotrichum elliottii (Torr. & A. Gray) G.L. Nesom	March American-aster	D	O	VA
	Symphyotrichum ericoides (L.) G.L. Nesom	White heath aster	D	FU-U	DE-MD-NJ-PA-VA-WV
	Symphyotrichum grandiflorum (L.) G.L. Nesom	Largeflower aster	D	.	VA
	Symphyotrichum laeve (L.) Á. Löve & D. Löve	Smooth blue aster	D	FU-U	DE-MD-NJ-PA-VA-WV
	Symphyotrichum lanceolatum (Willd.) G.L. Nesom	White panicle aster	D	FW	DE-MD-NJ-PA-VA-WV
	Symphyotrichum lateriflorum (L.) Á. Löve & D. Löve	Calico aster	D	FW-F	DE-MD-NJ-PA-VA-WV
	Symphyotrichum lowrieanum (Porter) G.L. Nesom	Lowrie's blue wood aster	D	.	MD-NJ-PA-VA-WV
	Symphyotrichum novae-angliae (L.) G.L. Nesom	New England aster	D	FW	DE-MD-NJ-PA-VA-WV
	Symphyotrichum novi-belgii (L.) G.L. Nesom	New York aster	D	O-FW	DE-MD-NJ-PA-VA-WV
	Symphyotrichum oblongifolium (Nutt.) G.L. Nesom	Aromatic aster	D	.	MD-NJ-PA-VA-WV
	Symphyotrichum ontarionis (Wiegand) G.L. Nesom	Bottomland aster	D	F	DE-WV
	Symphyotrichum patens (Aiton) G.L. Nesom	Late purple aster	D	.	DE-MD-NJ-PA-VA-WV
	Symphyotrichum phlogifolium (Muhl. ex Willd.) G.L. Nesom	Thinleaf late purple aster	D	.	DE-MD-NJ-PA-VA-WV
	Symphyotrichum pilosum (Willd.) G.L. Nesom	Hairy white oldfield aster	D	FW-F	DE-MD-NJ-PA-VA-WV
	Symphyotrichum praealtum (Poir.) G.L. Nesom	Willowleaf aster	D	FW	DE-MD-NJ-PA-VA-WV
	Symphyotrichum pratense (Raf.) G.L. Nesom	Barrens silky aster	D	.	VA
	Symphyotrichum prenanthoides (Muhl. ex Willd.) G.L. Nesom	Crookedstem aster	D	F	DE-MD-NJ-PA-VA-WV

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	Symphyotrichum puniceum (L.) Á. Löve & D. Löve	Purplestem aster	D	O	DE-MD-NJ-PA-VA-WV
	Symphyotrichum racemosum (Elliott) G.L. Nesom	Smooth white oldfield aster	D	FW	MD-NJ-PA-VA-WV
	Symphyotrichum shortii (Lindl.) G.L. Nesom	Short's aster	D	.	MD-PA-VA-WV
	Symphyotrichum subulatum (Michx.) G.L. Nesom	Eastern annual saltmarsh aster	D	O	DE-MD-NJ-PA-VA
	Symphyotrichum tenuifolium (L.) G.L. Nesom	Perennial saltmarsh aster	D	O	DE-MD-NJ-VA
	Symphyotrichum undulatum (L.) G.L. Nesom	Wavyleaf aster	D	.	DE-MD-NJ-PA-VA-WV
	Symphyotrichum urophyllum (Lindl.) G.L. Nesom	White arrowleaf aster	D	.	MD-NJ-PA-VA-WV
	Vernonia gigantea (Walter) Trel.	Giant ironweed	D	F	DE-MD-PA-VA-WV
	Vernonia glauca (L.) Willd.	Broadleaf ironweed	D	.	DE-MD-NJ-PA-VA-WV
	Vernonia noveboracensis (L.) Michx.	New York ironweed	D	FW	DE-MD-NJ-PA-VA-WV
Brassicaceae	*Arabis alpina* L.	Alpine rockcress	D	F	VA
	Arabis canadensis L.	Sicklepod	D	.	DE-MD-NJ-PA-VA-WV
	Arabis drummondii A. Gray	Drummond's rockcress	D	FU	DE-NJ
	Arabis glabra (L.) Bernh.	Tower rockcress	D	.	DE-MD-NJ-PA-VA-WV
	Arabis hirsuta (L.) Scop.	Hairy rockcress	D	.	MD-NJ-PA-VA-WV
	Arabis laevigata (Muhl. ex Willd.) Poir.	Smooth rockcress	D	.	DE-MD-NJ-PA-VA-WV
	Arabis lyrata L.	Lyrate rockcress	D	FU	DE-MD-NJ-PA-VA-WV
	Arabis missouriensis Greene	Green rockcress	D	.	PA-MD
	Arabis patens Sull.	Spreading rockcress	D	.	MD-PA-VA-WV
	Arabis serotina Steele	Shale barren rockcress	D	.	VA-WV
	Arabis shortii (Fernald) Gleason	Short's rockcress	D	FU	MD-PA-VA-WV
	Cardamine angustata O.E. Schulz	Slender toothwort	D	F-FU	DE-MD-NJ-PA-VA-WV
	Cardamine bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.	Bulbous bittercress	D	O	DE-MD-NJ-PA-VA-WV
	Cardamine clematitis Shuttlw. ex A. Gray	Small mountain bittercress	D	O-F	VA
	Cardamine concatenata (Michx.) Sw.	Cutleaf toothwort	D	FU	DE-MD-NJ-PA-VA-WV
	Cardamine diphylla (Michx.) Alph. Wood	Crinkleroot	D	FU-U	DE-MD-NJ-PA-VA-WV

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	Cardamine dissecta (Leavenworth) Al-Shehbaz	Forkleaf toothwort	D	.	VA-WV
	Cardamine douglassii Britton	Limestone bittercress	D	O-FW	MD-NJ-PA-VA-WV
	Cardamine flagellifera O.E. Schulz	Blue Ridge bittercress	D	FU	VA-WV
	Cardamine longii Fernald	Long's bittercress	D	O	DE-MD-NJ-VA
	Cardamine maxima (Nutt.) Alph. Wood	Large toothwort	D	.	NJ-PA-WV
	Cardamine micranthera Rollins	Streambank bittercress	D	O	VA
	Cardamine parviflora L.	Sand bittercress	D	FU	DE-MD-NJ-PA-VA-WV
	Cardamine pensylvanica Muhl. ex Willd.	Pennsylvania bittercress	D	O-FW	DE-MD-NJ-PA-VA-WV
	Cardamine pratensis L.	Cuckoo flower	D	.	MD-NJ-PA-VA-WV
	Cardamine rotundifolia Michx.	American bittercress	D	O	DE-MD-NJ-PA-VA-WV
Campanulaceae	*Campanula aparinoides* Pursh	Marsh bellflower	D	O	DE-MD-NJ-PA-VA-WV
	Campanula divaricata Michx.	Small bonny bellflower	D	.	MD-VA-WV
	Campanula rotundifolia L.	Bluebell bellflower	D	FU	MD-NJ-PA-VA-WV
	Triodanis biflora (Ruiz & Pav.) Greene	Small Venus' looking-glass	D	.	PA-VA
	Triodanis perfoliata (L.) Nieuwl.	Clasping Venus' looking-glass	D	F-FU	DE-MD-NJ-PA-VA-WV
Convolvulaceae	*Ipomoea hederifolia* L.	Scarletcreeper	D	FW-F	VA
	Ipomoea imperati (Vahl) Griseb.	Beach morning-glory	D	FU	PA
	Ipomoea lacunosa L.	Whitestar	D	FW-F	DE-MD-NJ-PA-VA-WV
	Ipomoea nil (L.) Roth	Whiteedge morning-glory	D	.	MD-VA
	Ipomoea pandurata (L.) G. Mey.	Man of the earth	D	FU	DE-MD-NJ-PA-VA-WV
	Ipomoea pes-caprae (L.) R. Br.	Bayhops	D	F	PA
Cornaceae	*Cornus alternifolia* L. f.	Alternateleaf dogwood	ST	F	DE-MD-NJ-PA-VA-WV
	Cornus amomum Mill.	Silky dogwood	S	FW	DE-MD-NJ-PA-VA-WV
	Cornus drummondii C.A. Mey.	Roughleaf dogwood	ST	F	PA
	Cornus foemina Mill.	Stiff dogwood	ST	FW	DE-MD-NJ-VA
	Cornus racemosa Lam.	Gray dogwood	S	F	DE-MD-NJ-PA-VA-WV

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	Cornus rugosa Lam.	Roundleaf dogwood	ST	.	DE-MD-NJ-PA-VA-WV
	Cornus sericea L.	Redosier dogwood	ST	.	DE-MD-NJ-PA-VA-WV
Ericaceae	*Gaylussacia baccata* (Wagenh.) K. Koch	Black huckleberry	S	FU	DE-MD-NJ-PA-VA-WV
	Gaylussacia brachycera (Michx.) A. Gray	Box huckleberry	S	.	DE-MD-PA-VA-WV
	Gaylussacia dumosa (Andrews) Torr. & A. Gray	Dwarf huckleberry	S	F	DE-MD-NJ-PA-VA-WV
	Gaylussacia frondosa (L.) Torr. & Gray ex. Torr.	Blue huckleberry	S	F	DE-MD-NJ-PA-VA-WV
	Lyonia ligustrina (L.) DC.	Maleberry	S	FW	DE-MD-NJ-PA-VA-WV
	Lyonia lucida (Lam.) K. Koch	Fetterbush lyonia	S	FW	VA
	Lyonia mariana (L.) D. Don	Piedmont staggerbush	S	F	DE-MD-NJ-PA-VA
	Rhododendron arborescens (Pursh) Torr.	Smooth azalea	S	FW-F	MD-PA-VA-WV
	Rhododendron atlanticum (Ashe) Rehder	Dwarf azalea	S	F	DE-MD-NJ-PA-VA
	Rhododendron calendulaceum (Michx.) Torr.	Flame azalea	S	.	MD-PA-VA-WV
	Rhododendron canadense (L.) Torr.	Rhodora	S	FW	NJ-PA
	Rhododendron canescens (Michx.) Sweet	Mountain azalea	S	FW	DE-MD-PA
	Rhododendron catawbiense Michx.	Catawba rosebay	S	FU	VA-WV
	Rhododendron cumberlandense E.L. Braun	Cumberland rhododendron	S	.	VA
	Rhododendron maximum L.	Great laurel	ST	F	DE-MD-NJ-PA-VA-WV
	Rhododendron periclymenoides (Michx.) Shinners	Pink azalea	S	F	DE-MD-NJ-PA-VA-WV
	Rhododendron prinophyllum (Small) Millais	Early azalea	S	F	MD-NJ-PA-VA-WV
	Rhododendron viscosum (L.) Torr.	Swamp azalea	S	O-FW	DE-MD-NJ-PA-VA-WV
	Vaccinium angustifolium Aiton	Lowbush blueberry	S	FU	DE-MD-NJ-PA-VA-WV
	Vaccinium arboreum Marshall	Farkleberry	ST	FU	VA
	Vaccinium caesariense Mack.	New Jersey blueberry	S	O	MD-NJ-PA-VA
	Vaccinium corymbosum L.	Highbush blueberry	S	FW	DE-MD-NJ-PA-VA-WV
	Vaccinium crassifolium Andrews	Creeping blueberry	S	F	VA
	Vaccinium elliottii Chapm.	Elliott's blueberry	S	FW	VA

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	Vaccinium erythrocarpum Michx.	Southern mountain cranberry	S	F	VA-WV
	Vaccinium formosum Andrews	Southern blueberry	S	O-F	MD-NJ-VA
	Vaccinium fuscatum Aiton	Black highbush blueberry	S	FW-F	DE-MD-NJ-PA-VA
	Vaccinium macrocarpon Aiton	Cranberry	S	O	DE-MD-NJ-PA-VA-WV
	Vaccinium myrtilloides Michx.	Velvetleaf huckleberry	S	F-FW	MD-PA-VA-WV
	Vaccinium oxycoccos L.	Small cranberry	S	O	MD-NJ-PA-VA-WV
	Vaccinium pallidum Aiton	Blue Ridge blueberry	S	.	DE-MD-NJ-PA-VA-WV
	Vaccinium stamineum L.	Deerberry	S	FU	DE-MD-NJ-PA-VA-WV
	Vaccinium tenellum Aiton	Small black blueberry	S	FU-U	VA
Fabaceae	*Cercis canadensis* L.	Eastern redbud	ST	FU-U	DE-MD-NJ-PA-VA-WV
	Galactia regularis (L.) Britton, Sterns & Poggenb.	Eastern milkpea	D	.	DE-MD-NJ-PA-VA
	Galactia volubilis (L.) Britton	Downy milkpea	D	FU	DE-MD-NJ-PA-VA-WV
	Strophostyles helvola (L.) Elliott	Amberique-bean	D	F-FU	DE-MD-NJ-PA-VA-WV
	Strophostyles leiosperma (Torr. & A. Gray) Piper	Slickseed fuzzybean	D	.	MD-NJ-PA-VA
	Strophostyles umbellata (Muhl. ex Willd.) Britton	Pink fuzzybean	D	F-FU	DE-MD-NJ-PA-VA
Geraniaceae	*Geranium bicknellii* Britton	Bicknell's cranesbill	D	.	NJ-PA-VA-WV
	Geranium carolinianum L.	Carolina geranium	D	.	DE-MD-NJ-PA-VA-WV
	Geranium maculatum L.	Spotted geranium	D	FU	DE-MD-NJ-PA-VA-WV
Hydrophyllaceae	*Hydrophyllum appendiculatum* Michx.	Great waterleaf	D	.	PA-WV
	Hydrophyllum canadense L.	Bluntleaf waterleaf	D	FW-FU	MD-NJ-PA-VA-WV
	Hydrophyllum macrophyllum Nutt.	Largeleaf waterleaf	D	.	MD-PA-VA-WV
	Hydrophyllum virginianum L.	Eastern waterleaf	D	FW-F	DE-MD-NJ-PA-VA-WV
	Nemophila aphylla (L.) Brummitt	Smallflower baby blue eyes	D	FW	DE-MD-VA-WV
	Phacelia bipinnatifida Michx.	Fernleaf phacelia	D	.	MD-NJ-PA-VA-WV
	Phacelia covillei S. Watson	Coville's phacelia	D	FW	MD-VA
	Phacelia dubia (L.) Trel.	Smallflower phacelia	D	.	DE-MD-PA-VA-WV

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	Phacelia fimbriata Michx.	Fringed phacelia	D	.	VA
	Phacelia hirsuta Nutt.	Fuzzy phacelia	D	.	PA
	Phacelia purshii Buckley	Miami mist	D	.	MD-NJ-PA-VA-WV
	Phacelia ranunculacea (Nutt.) Constance	Oceanblue phacelia	D	FW	WV
Lamiaceae	*Monarda bradburiana* Beck	Eastern beebalm	D	.	VA
	Monarda clinopodia L.	White bergamot	D	FU	DE-MD-NJ-PA-VA-WV
	Monarda didyma L.	Scarlet beebalm	D	F	DE-MD-NJ-PA-VA-WV
	Monarda fistulosa L.	Wild bergamot	D	FU-U	DE-MD-NJ-PA-VA-WV
	Monarda media Willd.	Purple bergamot	D	.	DE-MD-NJ-PA-VA-WV
	Monarda punctata L.	Spotted beebalm	D	FU-U	DE-MD-NJ-PA-VA
Liliaceae	*Erythronium albidum* Nutt.	White fawnlily	M	FU-U	MD-NJ-PA-VA-WV
	Erythronium americanum Ker Gawl.	Dogtooth violet	M	.	DE-MD-NJ-PA-VA-WV
	Erythronium umbilicatum Parks & Hardin	Dimpled troutlily	M	F	MD-VA-WV
	Uvularia grandiflora Sm.	Largeflower bellwort	M	.	MD-PA-VA-WV
	Uvularia perfoliata L.	Perfoliate bellwort	M	FU	DE-MD-NJ-PA-VA-WV
	Uvularia puberula Michx.	Mountain bellwort	M	F-FU	MD-NJ-PA-VA-WV
	Uvularia sessilifolia L.	Sessileleaf bellwort	M	F	DE-MD-NJ-PA-VA-WV
Malvaceae	*Hibiscus coccineus* Walter	Scarlet rosemallow	D	O	VA
	Hibiscus laevis All.	Halberdleaf rosemallow	D	O	MD-PA-VA-WV
	Hibiscus moscheutos L.	crimsoneyed rosemallow	D	O	DE-MD-NJ-PA-VA-WV
Onagraceae	*Oenothera argillicola* Mack.	Shale barren evening primrose	D	.	MD-PA-VA-WV
	Oenothera biennis L.	Common evening primrose	D	FU	DE-MD-NJ-PA-VA-WV
	Oenothera clelandii W. Dietr., P.H. Raven & W.L. Wagner	Cleland's evening primrose	D	.	NJ-WV
	Oenothera fruticosa L.	Narrowleaf evening primrose	D	F-FU	DE-MD-NJ-PA-VA-WV
	Oenothera grandiflora L'Hér. ex Aiton	Largeflower evening primrose	D	.	NJ-PA-WV
	Oenothera grandis (Britton) Smyth	Showy evening primrose	D	.	MD-NJ

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	Oenothera humifusa Nutt.	Seabeach evening primrose	D	.	DE-MD-NJ-PA-VA
	Oenothera laciniata Hill	Cutleaf evening primrose	D	FU	DE-MD-NJ-PA-VA-WV
	Oenothera linifolia Nutt.	Threadleaf evening primrose	D	.	VA
	Oenothera nutans Atk. & Bartlett	Nodding evening primrose	D	.	MD-NJ-PA-VA-WV
	Oenothera oakesiana (A. Gray) J.W. Robbins ex S. Watson & J.M. Coult.	Oakes' evening primrose	D	.	DE-MD-NJ-PA-VA
	Oenothera parviflora L.	Northern evening primrose	D	FU	DE-MD-NJ-PA-VA-WV
	Oenothera perennis L.	Little evening primrose	D	F	DE-MD-NJ-PA-VA-WV
	Oenothera pilosella Raf.	Meadow evening primrose	D	F-FU	NJ-PA-VA-WV
	Oenothera speciosa Nutt.	Pinkladies	D	.	PA-VA-WV
	Oenothera triloba Nutt.	Stemless evening primrose	D	.	PA-VA
	Oenothera villosa Thunb.	Hairy evening primrose	D	F-FU	MD-NJ-PA-VA-WV
Pontederiaceae	*Pontederia cordata* L.	Pickerelweed	M	O	DE-MD-NJ-PA-VA-WV
Polemoniaceae	*Polemonium micranthum* Benth.	Annual polemonium	D	FU	PA
	Polemonium reptans L.	Greek valerian	D	F-FU	DE-MD-NJ-PA-VA-WV
Portulacaceae	*Claytonia caroliniana* Michx.	Carolina springbeauty	D	FU	MD-PA-VA-WV
	Claytonia rubra (Howell) Tidestr.	Redstem springbeauty	D	.	VA
	Claytonia virginica L.	Virginia springbeauty	D	F-FU	DE-MD-NJ-PA-VA-WV
Primulaceae	*Lysimachia ciliata* L.	Fringed loosestrife	D	FW	DE-MD-NJ-PA-VA-WV
	Lysimachia hybrida Michx.	Lowland yellow loosestrife	D	O	DE-MD-NJ-PA-VA-WV
	Lysimachia lanceolata Walter	Lanceleaf loosestrife	D	F	MD-NJ-PA-VA-WV
	Lysimachia quadriflora Sims	Fourflower yellow loosestrife	D	O-FW	MD-PA-VA-WV
	Lysimachia quadrifolia L.	Whorled yellow loosestrife	D	FU	DE-MD-NJ-PA-VA-WV
	Lysimachia radicans Hook.	Trailing yellow loosestrife	D	O	VA
	Lysimachia terrestris (L.) Britton, Sterns & Poggenb.	Earth loosestrife	D	O	DE-MD-NJ-PA-VA-WV
	Lysimachia thyrsiflora L.	Tufted loosestrife	D	O	MD-NJ-PA-WV
	Lysimachia tonsa (Alph. Wood) Alph. Wood ex Pax & R. Knuth	Southern yellow loosestrife	D	.	VA-WV

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Rhamnaceae	*Ceanothus americanus* L.	New Jersey tea	S	.	DE-MD-NJ-PA-VA-WV
	Ceanothus herbaceus Raf.	Jersey tea	S	.	VA-WV
Rosaceae	*Fragaria ×ananassa* (Weston) Duchesne ex Rozier (pro sp.)	Strawberry	D	.	NJ-PA-VA-WV
	Fragaria vesca L.	Woodland strawberry	D	FU-U	DE-MD-NJ-PA-VA-WV
	Fragaria virginiana Duchesne	Virginia strawberry	D	FU	DE-MD-NJ-PA-VA-WV
	Potentilla arguta Pursh	Tall cinquefoil	D	.	MD-NJ-PA-VA-WV
	Potentilla canadensis L.	Dwarf cinquefoil	D	.	DE-MD-NJ-PA-VA-WV
	Potentilla norvegica L.	Norwegian cinquefoil	D	F-FU	DE-MD-NJ-PA-VA-WV
	Potentilla paradoxa Nutt.	Paradox cinquefoil	D	.	PA
	Potentilla rivalis Nutt.	Brook cinquefoil	D	FW	MD-VA
	Potentilla simplex Michx.	Common cinquefoil	D	FU	DE-MD-NJ-PA-VA-WV
	Waldsteinia fragarioides (Michx.) Tratt.	Appalachian barren strawberry	D	.	MD-NJ-PA-VA-WV
Rubiaceae	*Houstonia caerulea* L.	Azure bluet	D	F-FU	DE-MD-NJ-PA-VA-WV
	Houstonia canadensis Willd. ex Roem. & Schult.	Canadian summer bluet	D	.	PA-VA-WV
	Houstonia longifolia Gaertn.	Longleaf summer bluet	D	.	MD-NJ-PA-VA-WV
	Houstonia purpurea L.	Venus' pride	D	.	DE-MD-NJ-PA-VA-WV
	Houstonia pusilla Schoepf	Tiny bluet	D	F-FU	DE-MD-VA
	Houstonia serpyllifolia Michx.	Thymeleaf bluet	D	FW-F	MD-PA-VA-WV
Salicaceae	*Salix amygdaloides* Andersson	Peachleaf willow	ST	FW	PA
	Salix bebbiana Sarg.	Bebb willow	ST	FW	MD-NJ-PA
	Salix candida Flueggé ex Willd.	Sageleaf willow	S	O	NJ-PA
	Salix caroliniana Michx.	Coastal plain willow	T	O	DE-MD-NJ-PA-VA-WV
	Salix cordata Michx.	Heartleaf willow	S	F	MD-NJ-PA
	Salix discolor Muhl.	Pussy willow	ST	FW	DE-MD-NJ-PA-VA-WV
	Salix eriocephala Michx.	Missouri River willow	ST	FW	DE-MD-NJ-PA-VA-WV
	Salix humilis Marshall	Prairie willow	S	FU	DE-MD-NJ-PA-VA-WV

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	Salix interior Rowlee	Sandbar willow	ST	O-FW	DE-MD-NJ-PA-VA-WV
	Salix lucida Muhl.	Shining willow	ST	FW	DE-MD-NJ-PA-VA-WV
	Salix myricoides Muhl.	Bayberry willow	ST	FW	PA
	Salix nigra Marshall	Black willow	T	O	DE-MD-NJ-PA-VA-WV
	Salix pedicellaris Pursh	Bog willow	S	O	NJ-PA
	Salix petiolaris Sm.	Meadow willow	ST	FW	NJ-PA
	Salix sericea Marshall	Silky willow	ST	O	DE-MD-NJ-PA-VA-WV
	Salix serissima (L.H. Bailey) Fernald	Autumn willow	ST	O	NJ-PA
Saxifragaceae	*Heuchera alba* Rydb.	White alumroot	D	.	VA-WV
	Heuchera americana L.	American alumroot	D	FU	DE-MD-NJ-PA-VA-WV
	Heuchera longiflora Rydb.	Longflower alumroot	D	.	VA-WV
	Heuchera parviflora Bartlett	Littleflower alumroot	D	.	VA-WV
	Heuchera pubescens Pursh	Downy alumroot	D	.	MD-PA-VA-WV
Scrophulariaceae	*Agalinis auriculata* (Michx.) S.F. Blake	Earleaf false foxglove	D	.	MD-NJ-PA-VA-WV
	Agalinis fasciculata (Elliott) Raf.	Beach false foxglove	D	F	DE-MD-NJ-PA-VA
	Agalinis linifolia (Nutt.) Britton	Flaxleaf false foxglove	D	O-FW	DE-MD-VA
	Agalinis maritima (Raf.) Raf.	Saltmarsh false foxglove	D	O-FW	DE-MD-NJ-VA
	Agalinis obtusifolia Raf.	Tenlobe false foxglove	D	F-FU	DE-MD-PA-VA
	Agalinis paupercula (A. Gray) Britton	Smallflower false foxglove	D	FW	NJ-PA-VA
	Agalinis purpurea (L.) Pennell	Purple false foxglove	D	FW	DE-MD-NJ-PA-VA-WV
	Agalinis setacea (J.F. Gmel.) Raf.	Threadleaf false foxglove	D	.	DE-MD-NJ-VA
	Agalinis tenuifolia (Vahl) Raf.	Slenderleaf false foxglove	D	F-FU	DE-MD-NJ-PA-VA-WV
	Penstemon calycosus Small	Longsepal beardtongue	D	FU-U	MD-NJ-PA-VA
	Penstemon canescens (Britton) Britton	Eastern gray beardtongue	D	.	MD-PA-VA-WV
	Penstemon digitalis Nutt. ex Sims	Foxglove beardtongue	D	F	DE-MD-NJ-PA-VA-WV
	Penstemon hirsutus (L.) Willd.	Hairy beardtongue	D	.	DE-MD-NJ-PA-VA-WV

Family	Scientific Name	Common Name	Group	Habitat	Range
	Penstemon laevigatus Aiton	Eastern smooth beardtongue	D	F-FU	DE-MD-NJ-PA-VA-WV
	Penstemon pallidus Small	Pale beardtongue	D	FU	MD-NJ-PA-VA-WV
	Penstemon tubaeflorus Nutt.	White wand beardtongue	D	.	PA
Solanaceae	*Physalis angulata* L.	Cutleaf groundcherry	D	F-FU	DE-NJ-VA
	Physalis cordata Mill.	Heartleaf groundcherry	D	.	PA
	Physalis grisea (Waterf.) M. Martínez	Strawberry-tomato	D	.	NJ-PA-VA
	Physalis heterophylla Nees	Clammy groundcherry	D	.	DE-MD-NJ-PA-VA-WV
	Physalis longifolia Nutt.	Longleaf groundcherry	D	.	DE-MD-NJ-PA-VA-WV
	Physalis pubescens L.	Husk tomato	D	FU-U	MD-NJ-PA-VA-WV
	Physalis virginiana Mill.	Virginia groundcherry	D	.	DE-MD-NJ-PA-VA-WV
	Physalis walteri Nutt.	Walter's groundcherry	D	.	VA
Verbenaceae	*Verbena bracteata* Cav. ex Lag. & Rodr.	Bigbract verbena	D	FU-U	MD-NJ-PA-VA-WV
	Verbena hastata L.	Swamp verbena	D	FW-F	DE-MD-NJ-PA-VA-WV
	Verbena scabra Vahl	Sandpaper vervain	D	FW	MD-VA-WV
	Verbena simplex Lehm.	Narrowleaf vervain	D	.	DE-MD-NJ-PA-VA-WV
	Verbena stricta Vent.	Hoary verbena	D	.	DE-NJ-PA-WV
	Verbena urticifolia L.	White vervain	D	F	DE-MD-NJ-PA-VA-WV
Violaceae	*Viola affinis* Leconte	Sand violet	D	FW	MD-NJ-PA-VA-WV
	Viola appalachiensis Henry	Appalachian violet	D	.	MD-PA-WV
	Viola bicolor Pursh	Field pansy	D	F-FU	DE-MD-NJ-PA-VA-WV
	Viola blanda Willd.	Sweet white violet	D	FW	DE-MD-NJ-PA-VA-WV
	Viola brittoniana Pollard	Northern coastal violet	D	F	DE-MD-NJ-PA-VA
	Viola canadensis L.	Canadian white violet	D	F	MD-NJ-PA-VA-WV
	Viola cucullata Aiton	Marsh blue violet	D	O-FW	DE-MD-NJ-PA-VA-WV
	Viola hastata Michx.	Halberdleaf yellow violet	D	FU-U	MD-PA-VA-WV
	Viola hirsutula Brainerd	Southern woodland violet	D	FU	DE-MD-NJ-PA-VA-WV

Family	Scientific Name	Common Name	Group	Habitat	Range
	Viola labradorica Schrank	Alpine violet	D	F	DE-MD-NJ-PA-VA-WV
	Viola lanceolata L.	Bog white violet	D	O	DE-MD-NJ-PA-VA-WV
	Viola mackloskeyi Lloyd	Small white violet	D	FW	DE-MD-NJ-PA-VA-WV
	Viola nephrophylla Greene	Northern bog violet	D	FW	PA-WV
	Viola pedata L.	Birdfoot violet	D	FU	DE-MD-NJ-PA-VA-WV
	Viola pubescens Aiton	Downy yellow violet	D	FU	DE-MD-NJ-PA-VA-WV
	Viola renifolia A. Gray	White violet	D	FW	PA
	Viola rostrata Pursh	Longspur violet	D	FU	MD-NJ-PA-VA-WV
	Viola rotundifolia Michx.	Roundleaf yellow violet	D	F	DE-MD-NJ-PA-VA-WV
	Viola sagittata Aiton	Arrowleaf violet	D	FW-F	DE-MD-NJ-PA-VA-WV
	Viola selkirkii Pursh ex Goldie	Selkirk's violet	D	.	PA
	Viola septentrionalis Greene	Northern woodland violet	D	FU	MD-NJ-PA-VA-WV
	Viola sororia Willd.	Common blue violet	D	F	DE-MD-NJ-PA-VA-WV
	Viola striata Aiton	Striped cream violet	D	FW	DE-MD-NJ-PA-VA-WV
	Viola triloba Schwein.	Three-lobe violet	D	.	MD-NJ-PA-VA-WV
	Viola tripartita Elliott	Threepart violet	D	.	MD-PA-WV
	Viola villosa Walter	Carolina violet	D	FU	VA

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CONTENTS

Editor's Note....1

Specialist Bees of the Mid-Atlantic: Host Plants and Habitat Conservation
Jarrod Fowler....2

COVER PHOTOGRAPH

A female long-horned bee, *Melissodes denticulatus* Smith (Hymenoptera: Apidae), a specialist on New York ironweed, *Vernonia noveboracensis* (L.) Michx. (Asteraceae). Photographed near Lake Elkhorn, Columbia, Howard County, Maryland, 16 August 2015.

Photographed by Richard L. Orr